

Operation Manual for the Four-foot Teflon Integrating Sphere, Slick

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This document describes the state of the four-foot Teflon integrating sphere source, known as Slick, located at the NASA GSFC Code 920.1 Calibration Facility. Additionally, this document outlines the operation procedures for this source.

Keywords: Slick, Four-foot Integrating Sphere, Integrating Sphere, Power Supply

1.0 Introduction and General Description

1.1 General Description

The integrating sphere source consists of two parts: a 40" diameter spherical source and a source system power supply (Figure 1).



Figure 1 - The Slick Source System.

There have been no changes to this system since delivery on 2/15/94. Thus, manufacturer's documentation remains valid, and sufficiently describes the current system state.

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Manufacturer's documentation includes:

- PTFE Coated Integrating Sphere, Technical Proposal RFP5-42435/269
- PTFE Coated Integrating Sphere, Business Proposal RFP5-42435/269
- Final Report For NASA Contract NAS5-32349
- General Instructions, Custom USS-4000 Uniform Source System
- General Instructions, DM-1000 Detector Multiplexer
- General Instructions, LPS-045/200H Halogen Lamp Power Supplies

These documents are available in the CF Library.

1.2 Electronic Components

The primary components of the source system power supply are:

- Four lamp power supply units, Labsphere LPS-200-H.
- One Integrating Sphere System Control, Labsphere SC-5000.
- Two Detector Multiplexers, Labsphere DM-1000.
- Three Silicon detector assemblies, Labsphere SDA-050-U, $\lambda_{\text{center}}=450, 650, 950$ nm.

2.0 System Installation and Operation

2.1 Installation requirements

2.1.1 Power

Three standard 120V, 20A, 60Hz circuits are preferred. Connect two lamp power supplies to each of two circuits, with the third supplying power to the system control unit and multiplexers

2.1.2 Interconnection

Four cables, numbered 1 through 4, connect the lamp power supplies to the lamp banks through circular connectors.

Three BNC cables connect the monitor detectors to the multiplexers. The connections are labeled SD1, SD2 and SD3.

2.2 Initial Control Settings

System Control – OFF

Multiplexers – OFF

Power Supplies - OFF

2.3 System Operation

2.3.1 Preparation

None. All operating parameters are pre-set.



Figure 2 – System Control and Multiplexers.



Figure 3 - Slick Power Supply (1 of 4)

2.3.2 Startup

Turn the system ON by pressing the power switch on the system controller, multiplexer, and each of the power supplies. When power is applied, the power indicator lamp above the power supply will light, and the components will perform self-tests. The self-tests

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take approximately 30 seconds to complete. During the power supply self-test, the Lamp Start indicator will illuminate.

To turn the lamp banks ON, press the Lamp Start button. The supplies will then ramp up to the preset current output level.

2.3.3 Shutdown

2.3.3.1 Standby Shutdown

To turn a bank(s) off, but keep the power supply in standby mode, press the Lamp Stop button on the power supply for the bank. The supply will then ramp down the current level for the bank.

2.3.3.2 Complete Shutdown

Turn bank(s) off as outlined in 2.3.3.1, then turn the power supply off. Verify that the supply is off by checking the power indicator lamp.

2.3.4 Operation

2.3.4.1 Introduction

Operation of this spherical integrator source system is semi-automatic. There are four illumination levels.

2.3.4.2 Increasing the Current

Current level is preset to the operating point of 6.60A, and is not operator-adjustable.

2.3.4.3 Reducing the Current

Current level is preset to the operating point of 6.60A, and is not operator-adjustable.

2.3.4.4 Turning Lamps Off

There are four authorized illumination levels for Slick: 16, 12, 8, and 4 lamps. These illumination levels are achieved by turning banks off.

To turn a bank of lamps off, disable power to the bank, as described in 2.3.3.1.

The following table outlines the bank power supply states (on or off) to achieve the authorized illumination levels.

Number of Lamps ON	Power Supply #1	Power Supply #2	Power Supply #3	Power Supply #4
16	ON	ON	ON	ON
12	OFF	ON	ON	ON
8	OFF	OFF	ON	ON
4	OFF	OFF	OFF	ON

CAUTION: ALWAYS START AT THE 16 LAMP ILLUMINATION LEVEL, THEN GO TO 12, THEN 8, AND FINALLY 4.

2.3.4.5 Turning Lamps Back On

To turn a lamp bank back on, thus returning to a higher illumination level, ramp up the appropriate power supply or supplies, as described in section 2.3.2.

2.3.4.6 Shutting Down

To shut down the system:

Ensure all lamp banks are ramped down.

Turn the bank power supplies OFF.

Turn the system controller and multiplexer power switches OFF.